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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------------------------------------------------------|-------------|----------------------|---------------------|------------------|
| 09/892,872 | 06/28/2001 | Tatsuya Shimoda | 109975 | 3054 |
| 25944 | 7590 | 06/01/2005 | EXAMINER | |
| OLIFF & BERRIDGE, PLC P.O. BOX 19928 ALEXANDRIA, VA 22320 | | | ECKERT II, GEORGE C | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2815 | |

DATE MAILED: 06/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Etc

| | | | |
|------------------------------|---------------------------------|--------------------------------|--|
| Office Action Summary | Application No. 09/892,872 | Applicant(s) SHIMODA ET AL. | |
| | Examiner George C. Eckert II | Art Unit 2815 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 March 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 26-32 is/are pending in the application.
 - 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 26-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 May 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some * c) ☐ None of:
 - 1. ☒ Certified copies of the priority documents have been received.
 - 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Applicant's amendment dated March 16, 2005, in which claims 1-25 were canceled and claims 26-32 added, has been entered.

Specification

2. The disclosure is objected to because of the following informalities: in paragraph 0085, line 2, it is believed that "62" should be deleted and --62A-- inserted in its place. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 26-30 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith '186 in view of Applicant's Prior Art Admission's, WO '170 and Brown (all of record and applied in the last Office action).

Smith teaches, for example in figure 7, a substrate 10 including a plurality of recesses 55 and microstructures 19 formed in the recesses. Smith teaches that the microstructures may support a wide range of devices such as diodes, transistors, integrated circuits, display devices, etc. (col. 1, lines 30-34). Smith also teaches that the microstructures may comprise silicon (col.

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4, line 55), as may the substrate (col. 14, lines 18-24). Smith does not expressly teach that the microstructures may comprise a ferroelectric PMA or a peripheral circuit for the PMA.

As made clear in the previous Office action (as discussed in AAPA and in Brown), as well as the Office action mailed August 19, 2003, integration of PMAs and their associated peripheral circuits was known in the art and it was also known that the integration of the PMA and its peripheral circuit caused some degree of degradation to either or both the PMA and the circuit. As such, it is considered obvious to one of ordinary skill in the art at the time the invention was made, to have manufactured the known PMA and peripheral circuit separately and integrate them on a common substrate via microstructures as taught by Smith for the purpose of obviating the device performance drawbacks which were known in the prior art.

Regarding the limitations of claims 27, 29 and 32, general changes in the size, shape or layout to known structures are considered obvious as within the skill of a mechanic in the art. As such, the specific limitations that the microstructures are in contact, that there are a plurality of first microstructures or that the second microstructure is larger than the first, are considered obvious. Regarding claim 28, it is well known and considered obvious that the peripheral circuit of a memory device, such as the ferroelectric PMA of the prior art, must have word lines and bit lines to properly function; as such, it is considered obvious that the second microstructure further comprises word and bit line drivers. Finally, regarding claim 30, as shown in the prior art WO '170 (and AAPA fig. 26B), the PMA has electrical connections formed on its bottom so that, when the PMA was placed in a recess, drain wiring would necessarily be formed along the bottom and sidewall of the first recess portion so that external connections could be made. In all, claims 26-30 and 32 are considered obvious.

4. Claims 26-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukushima (4,907,062) in view of AAPA, WO '170 and Brown.

Similar to the above rejection in light of Smith, Fukushima also teaches (see fig. 7) that recesses 5 may be formed in a substrate 4 and that microstructures 2 may be formed in the recesses. Fukushima does not expressly disclose that the microstructures 2 may comprise a ferroelectric PMA or its associated peripheral circuit. However, in light of the known processing difficulties (see again AAPA and Brown teaching that either or both the PMA and circuit must suffer if processed together), it is considered obvious that the two devices be processed separately and then integrated as taught by Fukushima. Moreover, Fukushima provides several additional motivating factors for forming the two devices separately and then integrating them as microstructures on the same substrate such as: the individual circuits/components are individually tested so that overall yield is increased, design freedom is enhanced, *the individual devices may be fabricated in existing production facilities without need for additional or special facilities (thus eliminating the problems caused by conflicting processes)* and heat resistance is reduced (col. 6, lines 14-38).

Regarding the limitations of claims 27, 29 and 32, general changes in the size, shape or layout to known structures are considered obvious as within the skill of a mechanic in the art. As such, the specific limitations that the microstructures are in contact, that there are a plurality of first microstructures or that the second microstructure is larger than the first, are considered obvious. Moreover, Fukushima teaches in figure 2b-1 that the recesses 5 are not constrained to a specific or repeating pattern and that design freedom is enhanced. Fukushima also teaches that the microstructures 2 are of different sizes (see fig. 7). Regarding claim 28, it is well known and

considered obvious that the peripheral circuit of a memory device, such as the ferroelectric PMA of the prior art, must have word lines and bit lines to properly function; as such, it is considered obvious that the second microstructure further comprises word and bit line drivers. Regarding claim 30, as shown in the prior art WO '170 (and AAPA fig. 26B), the PMA has electrical connections formed on its bottom so that, when the PMA was placed in a recess, drain wiring would necessarily be formed along the bottom and sidewall of the first recess portion so that external connections could be made. Finally, regarding claim 31, Fukushima teaches that a planarized film 6 is formed between the microstructures (fig. 6 and col. 3 line, 65 to col. 4, line 27). In all, claims 26-32 are considered obvious.

Response to Arguments

5. Applicant's arguments filed March 16, 2005 have been fully considered but they are not persuasive. Applicant argues on page 5 of the response that the previously applied references fail to teach or suggest the features of the new claims. However, as pointed out in the previous rejections and essentially reiterated above, the references do make obvious the limitations of the new claims. Furthermore, Fukushima also makes obvious the instant claims as discussed above.

Conclusion


6. Applicant's amendment necessitated the new ground of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to George C. Eckert II whose telephone number is (571) 272-1728. The examiner can normally be reached on Monday - Friday, 8:00 to 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


GEORGE ECKERT
PRIMARY EXAMINER